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August 8, 1956

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Dear Jim:

I have asked Cary to review the design specifications for System 4 which you revised on June 28, 1956, the objective being that of determining to what extent our opinions and conclusions might differ from those expressed in your note. The numbered paragraphs below provide comment on the corresponding numbered paragraphs of your summary.

1. It is very doubtful that the entire assembly will be mounted on the vehicle hatch cover because of the low clearance between the bottom of the hatch and the ground. The antennas will definitely be mounted on the hatch cover; it is likely, however, that other units of the system will need to be installed independently.
2. No comment.
3. The performance indicated here must be regarded in the light of design objectives in view of the sharply limited time available for equipment development. In particular, the 15 db noise figure may not be obtained on all of the APR-9 receivers. It must be borne in mind that has spent a comparatively long period of time in obtaining that value, and has had repeated opportunities to evaluate the performance of a number of circuit configurations. Corresponding opportunities do not exist in the present case, and while every effort will be made to obtain a uniformly low noise figure, there can be no real assurance that the value of 15 db will be achieved on all receivers.
4. No comment.
5. The requirements on antennas have probably varied more during the course of this program than those for any other element of the system. Every effort will be made to meet the particular beam configurations desired, but again it must be remembered that a total period of four months for equipment development limits to a most pronounced degree the time available for study and modification of pattern structure to meet precise requirements.

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6. The last two sentences of this paragraph relating to AGC again are not applicable. The actual type of AGC to be employed was discussed by [] during the latter's most recent visit to our plant. 25X1
7. Sufficient time does not exist to develop a video recorder employing intensity modulation of the raster with a specified dynamic range of the order of 40 db. A set of specifications describing the type of recording to be employed has been prepared and discussed with [] during his last visit. 25X1
8. It is unlikely that any elements other than the antennas will be fastened to the hatch cover for the reasons indicated in paragraph 1.
9. The video recorder will be programmed so that it will search all receiver outputs, and photograph in time sequence the signals of each locked receiver. It will not photograph the signals from a given lock-on a second time, the equipment structure being such as to necessitate a break of lock-on before the video recorder can again photograph a channel which had experienced a lock previously. The photographing time on each lock-on will be fixed at the minimum time required to complete photography of the rasters created at several different scanning rates.
10. No comment.
11. No comment.

From the above comments you will note that we seem to be in general agreement on most aspects of System 4 design, and the areas of disagreement are perhaps relatively unimportant. Certainly, the methods to be employed for mounting the equipment in the airplane cannot be devised at a distance. Procedures of this kind must be left up to the system engineers to solve in a manner consistent with all requirements for system installation and utilization.

The desire for variable time of photography could undoubtedly be met at some expense in development time and cost. The value of a variable time of photography, extending from 0.1 second to 100 seconds, might be rather difficult to justify. Modulation data for the entire duration of a lock-on will be available from the magnetic tape record in any event, and

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since a sample of the r-f signal wave form will have been photographed during the lock-on period, it is not clear that the system complications and increase of quantity of film required to permit photography for long periods of time could be supported on a logical basis. More importantly, perhaps, it is somewhat late in the state of the development program to consider the provision for variable time of photography and such provision is not being made, therefore, at this time.

Sincerely,



Burt

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